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ABSTRACT

Although there are efforts to equalize educational methods and materials, some differences between males and females may be better served by emphasizing rather than neutralizing gender. One such point is in the area of visual imagery. Studies have shown that imagery preferred by males and females differs in certain visual characteristics. The purpose of this paper is to: (1) review characteristics of gender-based imagery preferences of children identified in the literature; (2) relate these characteristics to a taxonomy of aesthetic-developmental stages; and (3) present research guidelines and considerations for selecting images based on imagery preferences and gender-based influences with respect to aesthetic awareness and art experience. Girls tend to prefer colorful, detailed images of people (especially female characters), plants, and animals, and those that are peaceful. Boys prefer images that imply action, suspense, danger, or rescue, and/or that include male characters and vehicles. A child's prior knowledge of art should be considered as a factor in imagery preference because aesthetic development can be accelerated by strong art education programs. When selecting instructional images based on gender, certain artistic factors must be considered: the artistic style of the image; the subject matter; prior experience or exposure to the image; and the cognitive-perceptual abilities of the learner. Further research is also needed to understand the impact of gender-based visual imagery in learning and the appropriateness of catering specifically to gender preferences. (DGM)

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Girls Like Colors, Boys Like Action? Imagery Preferences and Gender

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Introduction

While the heyday of the 1980's feminist movement has passed, concerns surrounding sex equity and equality have remained. In education, the issues of gender-fair teaching practices and the development of non-stereotypic educational materials currently enjoys attention equal to that given to multicultural and disabilities issues. Yet during these attempts to equalize methods and materials, we find some points at which differences between males and females may be better served by emphasizing rather than neutralizing gender differences.

One such point is in the area of visual imagery. Studies have shown that imagery preferred by males and females differs in certain visual characteristics (Freedman, 1991; Jakobsdóttir,Krey, & Sales, 1994; McNiff, 1982; Savarese & Miller, 1979). Does a gender-based preference suggest that imagery used in instructional materials be personalized for each sex or weighted toward one or the other set of characteristics? Are there other developmental and aesthetic factors to be considered before such gender-personalized materials are developed?

The purpose of this paper is to (a) review characteristics of gender-based imagery preferences of children identified in the literature, (b) to relate these characteristics to a taxonomy of aesthetic-developmental stages and (c) to present research guidelines and considerations for selecting images based on imagery preferences and gender-based influences with respect to aesthetic awareness and art experience. The paper concludes with a brief discussion of the implications gender-based imagery preferences have for research and instructional design.

Gender-based Imagery Preferences

Close examination of the actual imagery produced by children (using any medium) consistently reveals certain differences in subject matter graphically presented by males and females (Freedman, 1989; McNiff, 1982; Wilson & Wilson, 1980). McNiff (1982) examined over 1800 drawings of twenty six children and found that boys and girls

usually create images that are very different in subject matter. No stereotypic sex-role images were created by the children, yet McNiff noted striking differences in expression. Girls tended to favor images of people and the human face, holiday imagery, plants and animals, and detailed landscapes. Boys most often drew images of conflict and power struggles, sea animals, exotic locations, and sports scenes (p. 283). McNiff's interpretation of these involvements are rooted in an anthropological/archeological argument: "...the differences in the art of girls and boys may originate in ancient traits within the species, and which are most manifest in early childhood. These differences can therefore be both conditioned and genetic" (McNiff, 1982, p. 283).

Other studies of children's art imagery using traditional art media such as pencil, paint, or clay provide the foundations of imagery preference studies in computer-based instruction. Pariser's (1979) study, though inconclusive, raised the issue of where children's imagery sources originate: are the sources "...canonical -- given to us by our culture and applied according to convention...[or are they] derived mainly from our direct sensory contact with the world?" (Pariser, 1979, p. 30). Pariser believes that there is no clear winner in the debate between sensory-experiential and cultural conditioning. Rather, he found that certain conventions are used in some cases of solving "unique" art problems while at other times, children (and adults) rely on personal perceptions and observations.

Several preference studies have concluded that gender is not a significant factor in determining which images are preferred by study participants. A study that examined style preference (Ramsey, 1982) among first through third graders, concluded that boys and girls did not differ in degree of preference for photographic, representational, cartoon or expressive styles. Rather, children preferred one style to another in terms of the accompanying text content (p. 238-240). Exposure to a Matisse painting using three different methods (Bowker & Sawyers, 1988): hanging the print in a child's classroom for six weeks, hanging the print in a child's bedroom for six weeks,

or having an art teacher discuss the painting and the artists in class, found an increase in choosing similar stylistic paintings on a post-test. Children in this study had previously been administered a pre-test for style preference and presentation preference (color or black and white). Bowker et. al. (1988) conclude that children have consistent preferences for certain styles, that their preference can be influenced by exposure to art works, and that text analysis of why children chose specific images "revealed color and subject matter to be the most frequently given responses" (p. 113).

Age rather than gender is also most often reported as the determining factor in imagery preference studies. One article entitled *Women as Art Viewers: Sex Differences and Aesthetic Preference* (Chalmers, 1977) was an attempt to understand the origins of apparent gender differences and how art education promoted sex stereotyping. Chalmers points to sex biased studies from the 1930's through the 1950's that supported social assumptions about male and female behavior. He states that: "...sex differences in aesthetic preference are considerably less than the differences in preference caused by such variation among groups as age, social class, special training, and vocation" (Chalmers, 1977, p. 51) but does not provide support for his conclusion.

Taunton (1980) tested five groups of thirty respondents, fifteen male and fifteen females in each age group of four, eight, twelve, and sixteen year olds. Reproductions of art works were shown to respondents in an individual testing situation. Analysis on the effects of age, sex, subject-matter, degree of realism, and spatial depth found an insignificant effect for sex (meaning gender) and was dropped from further analysis.

While we should not go so far as to assign causality to any of Chalmers' list of influences; age, race, class, and experience levels must be considered when studying gender effects and imagery preferences. However Chalmers, Taunton and other researchers who "factored out" gender as insignificant, may not have presented images that would elicit a significant gender-based response. That is, images presented to the respondents were, for the most part, images that were not of high interest or appeal for

either sex. If we agree with the suggestions of McNiff, Jakobsdóttir and Krey, and others that there are certain characteristics or physical elements that seem to appeal more to boys than to girls then we must conclude that imagery preference studies based on gender-neutral imagery would not and do not yield any significant gender effect on imagery preference.

In those preference studies where the respondents' preference was not limited by a set of neutral images or where respondents could create their own images, clear gender differences were noted. It would seem reasonable then to identify and present respondents in preference studies with images that are of greater appeal to boys and to girls if the point is to ascertain the effect of gender on imagery preferences and to further validate and identify characteristics of images that evoke a strong response or neutral response from males and females.

In a recent presentation, Jacobsdóttir & Krey (1993) proposed guidelines for computer graphic designs based on a review of imagery studies in instructional design and art education. Table 1 provides an abbreviated overview of their guidelines.

Table 1 Characteristics of Gender-based Imagery Preferences

High Appeal for Girls	High Appeal for Boys
Detailed images of people, plants,and animals.	Images implying action
Use of a variety of colors.	Including images of vehicles.
Including female characters.	Including male characters.
Peaceful images.	Images of suspense/danger/rescue.

In a later study, the guidelines were used to develop images specifically for high interest to males or for females. Imagery characteristics were also blended to develop images that would theoretically appeal to males and females equally (Jakobsdóttir,Krey, & Sales, 1994). Their findings indicated that males rated high male-appeal images highest, as did females rating high female-appeal images. No significant gender differences (i.e., images did not hold high appeal for either sex) were found for the neutral or equal interest images.

Though Jacobsdóttir, Krey & Sales found a significant gender effect for images developed with gender-based preferences in mind, they also found a significant age effect. Their data and anecdotal recall of comments made by respondents indicates that the images may have been more appropriate for the younger respondents. Both *Storybook Weaver: World-of-Adventure* (MECC, 1991a) and *Storybook Weaver: World-of-Make-Believe* (MECC, 1991b) produce images that are better suited to K-4th grade students, though the software developers suggest that they can be used through grade 6. Older respondents suggested that the images were "too cartoony" or not realistic enough for them (Jacobsdóttir, personal communication).

The range of artistic or illustrative style (Ramsey, 1982), degree or range of realistic representation, color, perceived depth (Bowker & Sawyers, 1988; Hardiman & Zernich, 1982; Taunton, 1980) and "picture completeness" (the inclusion of background/foreground, attention to composition, balance and rhythm) of the image seem to play a significant role in the preferences of children, male or female. That is, a mixing of realistic images with Abstract Expressionist images during a preference study is more likely to identify differences in aesthetic developmental stages rather than gender differences.

Stages of Aesthetic Awareness

The age effect for imagery preference and preference for realism noted by Jacobsdóttir, Krey & Sales roughly parallels cognitive-developmental stages as well as

Kohlberg's stages of moral development (Kohlberg, 1981). Michael Parsons (1987) suggests that imagery preferences in a cognitive-developmental model of aesthetic experience also follow stages of aesthetic awareness and understanding represented by five stages of aesthetic development (see Table 2).

Table 2 Stages of Aesthetic Development

STAGE	EXAMPLE
ONE: Favoritism Style: Emotionalist	favorite color, subject matter, stimulus of good experience
TWO: Beauty and realism Style: Imitationalist	if it looks real, it is good and liked if not beautiful, must be bad and is not liked
THREE: Expressiveness Style: Expressionist	if feeling is expressed, must be good. awareness of experiences of other's feelings
FOUR: Style and form Style: Formalist	personal judgment is made within the social context of art history and criticism. meaning and judgment are defined within the art tradition: a public rather than private understanding. is aware of materials, history, art periods, etc.
FIVE: Autonomy Style: Gestalt	individual ..."must judge the concepts and values with which the tradition constructs the meaning..." (p. 25) of art imagery

(Adapted from Parsons, 1987)

Parsons makes a case for the current state of aesthetic awareness in the general American population. He offers evidence that many *adults* are often stalled at stage 2 equating beauty and realistic representation with fine art. Certainly, if the stages of aesthetic development follow Parsons' model, we must assume that children generally cannot be expected to be beyond stage 2 by the 6th grade, which would account for much of the age effect/aesthetic awareness level noted by Jacobsdóttir, Krey & Sales (1994).

Images used in the above study focused solely on the characteristics of high appeal for males and females identified in imagery studies but did not control for artistic factors such as degree of realism or stylistic preferences. Again, given the stages of aesthetic development, older children or children at stage 2 in Parson's taxonomy may have rated the images lower in Jacobsdóttir, Krey & Sales' study due to a lack of realistic representation rather than the appeal to gender-based preferences. And certainly children who had a substantive art knowledge base would rate the images differently in terms of style, degree of realism and presentation which would mask a gender effect.

An earlier study by Gardner and Gardner (1973) provides some support for Parsons' taxonomy. In that study, 10 males and 10 females at ages 5, 7, 11, 14 and 19 were asked to sort a set of four paintings into two piles "...placing together those paintings he [or she] thought were 'most similar' or 'most alike' " (Gardner & Gardner, 1973, p. 53). The Gardners sought to answer questions concerning gender and developmental factors as they relate to how images are sorted, whether by subject matter or form. Study participant verbalizations were noted by the researchers during the sorting activity. No significant gender difference was found but a significant age effect was noted. The Gardners concluded that younger subjects most often sorted by subject matter and that the youngest (5 year olds and many 7 year olds) believed that this was the only possible way to sort the images. Older children sorted the images most often on form with the 19 year olds and most 14 year olds offering several

alternative ways to sort the images . Gardner and Gardner believe that this ability to sense formal aspects of the art work more closely resembles the behavior of the connoisseur (or expert) which demonstrates a higher aesthetic awareness stage. Younger participants could be shown other ways to sort the images yet the Gardners offer their study as evidence that children may need to progress from less developed aesthetic awareness (characterized by a concentration on subject matter) as a "...necessary precondition" (p. 56) to development of connoisseurship or higher stages of aesthetic awareness.

Unlike the stages of moral development, there is evidence that awareness of aesthetic development can be accelerated by whole stages when learners "...engage in an extensive art ... program" (Erickson, unpublished manuscript). The increase in the art knowledge base (through strong art education programs) and the accompanying accelerated advance through the stages of aesthetic development suggests that the prior art knowledge of learners should be considered as a factor in imagery preference research and instructional design.

Guidelines for Selecting Images Based on Gender Preferences and Artistic Factors

How do we select images that appeal to males or females for both research and design? What other constraints should be placed on their selection? Setting aside for a moment questions concerning the appropriateness of deliberately choosing images for instructional materials based on gender preferences and how such images impact research and instructional design, the following is a description of those characteristics that appeal to males or females and the artistic controls that should be placed on the images with respect to aesthetic awareness.

Thus far, characteristics of images found throughout the literature that appeals to males or females have been outlined in Table 1. Table 2 summarized the stages of aesthetic development based on the art knowledge of the general population, that is, people not specifically trained in visual arts. In Figure 1, characteristics of images

listed in Table 1 are categorized by their relationship to the stages of aesthetic awareness.

The characteristics listed in both Table 1 and Figure 1 are by no means exhaustive. Rather, they are characteristics that have been identified in imagery studies, studies of images made spontaneously by children (McNiff, 1982) and in certain studies of software design (Forsythe & Lancy, 1990; Littleton, 1993). Note that the characteristics identified do not extend to Parsons' fourth and fifth stages of aesthetic development. A review of the studies used to identify the gender-based imagery preferences reveals that the characteristics listed here were based largely on the preferences of children. For purposes of this paper, a learner is a child until about age 11 (Whiting & Edwards, 1988). Therefore the guidelines for selecting images presented in Figure 1 are more appropriate for children ages 11 and under than they are for adolescent and adult learners.

Figure 1. Relationship of gender-based imagery preferences to aesthetic developmental stages.

	Image Characteristics	Favoritism	Beauty and realism	Expressiveness	Style and form	Autonomy
Girls	Variety of colors	■	■	■		
	Detailed images of people, plants, animals	■	■			
	Include female charcaters	■	■			
	Peaceful images*	■	■	■		
Boys	Strong colors	■	■	■		
	Images of vehicles	■	■			
	Include male characters	■	■			
	Images of suspence, danger and rescue*	■	■	■		

* Both realistic and expressive.

Notice that stage one and two are addressed by all of the imagery characteristics listed while stage three, Expressiveness, is covered only by color and "mood" characteristics of peace or danger/action. Expressiveness in Parson's taxonomy is not limited to realistic images or specific subject matter. Indeed, "expressiveness" may be devoid of recognizable (representational) subject matter. Thus when selecting images for males or females, certain artistic factors and learner characteristics must also be addressed with respect to the stage of aesthetic awareness:

1. *Consider artistic style of the image* (Hardiman & Zernich, 1982; Ramsey, 1982). If styles vary from photographic images to crudely drawn cartoons, there is an increased chance that style rather than gender will influence the image preference. For example, more realistic images are likely to be selected by older children and those at stage two.

2. *Consider the subject matter* (McNiff, 1982). Favoritism (stage one) and realism (stage two) are strongly associated with subject matter. Subject matter preferred by males or females or subject matter that may appeal to both are considerations to which both researcher and designer must attend.

3. *Consider prior experience or exposure to the image* (Bowker & Sawyers, 1988). Children, and indeed adults, who have some familiarity with particular images or artistic styles or popular artists such as Norman Rockwell or Andy Warhol are more likely to prefer those images over unfamiliar images. Likewise, children who have a rich art knowledge base may be at a stage of aesthetic development far beyond the intended age suggested by these guidelines which are based on the general population's experience with art.

4. *Consider the cognitive-perceptual abilities of the learner* (Hardiman & Zernich, 1982; Savarese & Miller, 1979). A considerable body of research has been done on field dependence/independence, perception of parts and wholes in visual grouping (Neperud & Serlin, 1984) and visual perception in general. It is worthwhile

to consider the cognitive-perceptual abilities of learners as another factor in selecting images for study or instruction.

It should be noted here that the above considerations are relative to the nature of the inquiry. Different questions will require different configurations of the above guidelines. For example, when images are to be used in imagery-preference or visual perception research, controlling for these factors will decrease their confounding effect on the interaction of gender and imagery preference. When used in instructional design, a better understanding of learner characteristics and personal context is obtained, and a more appropriate design (with respect to the intended audience) is obtained.

The suggested guidelines do not specifically address how to assess a learner's overall stage of aesthetic awareness or its constituent parts: prior art experience (consideration 3) and the cognitive-perceptual style (consideration 4) of the learners. Nor do the guidelines suggest (to the researcher or designer untrained in art) how best to either select or control for artistic factors such as degree or range of realistic representation, color, perceived depth, subject matter or artistic style (considerations 1 and 2).

The artistic factors are somewhat less problematic: the world of art history, art production, art criticism and aesthetics have a certain agreement about the scope of each of the factors. It is up to the researcher to locate the necessary artistic parameters for images. Or, in the case of instructional design, an art specialist would be a necessary resource and subject matter expert.

A more difficult task awaits the researcher or designer when the assessment of prior art experience and cognitive-perceptual styles is necessary (considerations 3 and 4). It is beyond the scope of this paper to identify reliable assessment instruments in these areas, though there are a few available. Again, the researcher as well as the

designer must be willing to pay attention to learner characteristics before conducting research or designing instruction. Such attention to the learner early in the study or instructional design is (and must be) basic to both theory and practice. The point here is that the researcher and the designer must consider not only the visual characteristics of images preferred by males or females but must also attend to the stage of aesthetic awareness of the study subjects and learners. The short list of considerations presented above provides a framework for both educational inquiry and instructional design in the area of gender-based imagery preferences.

There should be nothing surprising to researchers or designers in the list. Front end analysis in instructional design as well as good research practices emphasize a need for an analysis of prior knowledge or entry level skills, cognitive abilities of the learner and an analysis of the materials to be presented prior to research or instructional design. However, very few (if any) imagery studies in educational technology have included such analysis in the area of art and visual literacies. Perhaps it is time to reevaluate the role of imagery in learning and consider the full range of intelligences when analyzing learners (Gardner, 1983).

Implications for Further Research

Visual imagery in educational materials is an important aspect of educational media. To assume that visual imagery is devoid of overt and covert messages is to tread on dangerous ground. "Every media kit has its cognitive caboodle" (Ullmer, 1994, p. 22). And with respect to the topic of this paper, every media kit has its socio-personal, cultural, and gendered caboodle as well (Jonassen, Campbell, & Davidson, 1994). Within each media kit, is a complex relationship of educational message and delivery system,which includes presentation mode (text, and image). The current debate among instructional technologists as to the importance of media in learning (Clark, 1994a; Clark, 1994b; Kozma, 1994a; Kozma, 1994b; Ullmer, 1994) lends a sense of urgency to the study of both imagery and text in learning. If we accept the

idea that the challenge in instructional design and development is to understand media and method together as part of the learner's context, we must also become more concious of what images (visual and verbal) mean in that context, beyond the intended purpose specified in the lesson.

Taking a slightly different approach to imagery preference research specifically, we might wonder what happens when images have characteristics that do not appeal to learners. For example, we might ask: to what degree does imagery (using characteristics of high appeal for one sex or the other) effect the opposite sex with respect to learning? By altering characters from an all male cast of humans to gender-neutral bears, Littleton (1993) found that girls completed a navigation and problem solving task on an equal basis with boys while not negatively affecting the performance of boys on the same task. A similar result was found by Forsyth and Lancy (1990) using a commercially available mapping and place location software based on Winnie-the-Pooh. Their study found no significant gender differences in learning or using the program and suggest that this result is due to the lack of noticeable male orientation, has only mild competition and includes "... a cast of characters balanced among male, female, and neuter (Eeyore? Roo?)" (Forsythe & Lancy, 1990, p. 55). However, much more research is needed before we conclude that images used in instructional design should consistently have a more "female orientation."

Further research is also needed to understand the impact of gender-based visual imagery in learning and the appropriateness of catering specifically to gender preferences. Certainly in the areas of visual perception and mental modeling, both imagery and gender are important factors. According to dual coding theory (Clark & Paivio, 1991) , imagery is processed both as verbal and non-verbal information and assumes a major portion of the knowledge base. Differences in individual experiences account for differences in mental imagery as well as the depth and breadth of cognitive

connections to prior experiences. Meaning in dual coding theory is made through processing verbal information (semantic encoding) and non-verbal information (iconic encoding) separately as well as together thus emphasizing the equal importance of verbal and imaginal representations in learning (Clark & Paivio, 1991, p. 157). If we agree that "lessons containing concrete information and evoking vivid images will be easier to comprehend and remember than lessons that are abstract and not image-arousing" (p. 173), then it should follow that attention given to images and/or image characteristics most evocative for learners may ultimately result in richer and more meaningful learning experiences. If gender-based preferences in imagery evoke vivid images, we may well wish to develop instruction geared specifically for males or females. However, such considerations taken to the extreme may quickly become the basis for institutionalized sexism. Researchers and designers must take care to consider where attention to gender-based preferences is a help and where it is a hindrance if not an outright harm to learning and to the learners.

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